Cisco MC3810–IGX 8400 Interworking

Feature Summary

Using the Cisco MC3810–IGX 8400 Interworking functionality, you can configure the Cisco MC3810 multiservice access concentrator to act as an access device to the IGX 8400 switch. On the Cisco MC3810, a frame trunk card (FTC) trunk port is configured to send traffic to the IGX frame trunk module (FTM) port using the network management system (NMS) protocol. Using IGX Interworking, you can scale large networks of Cisco MC3810 concentrators to IGX 8400 switches.

Note This feature module provides only configuration information for the Cisco MC3810. For information about IGX switch configuration and commands, see the *Cisco WAN Switching Command Reference* for version 9.1.

Benefits

Cisco MC3810–IGX 8400 Interworking provides the following benefits:

- Enables the scaling of large networks of Cisco MC3810 concentrators to IGX 8400 switches.
- Provides central site solutions that minimize equipment costs, simplify network configuration, and provide end-to-end quality of service and prioritization.
- Unlike other vendors, whose products require multiple Frame Relay Access Devices (FRADs) at a central site to de-couple voice and data, the Cisco MC3810–IGX 8400 Interworking solution allows you to terminate voice and data directly on the switch. This minimizes central site management costs by eliminating extra cabling, equipment, and space requirements.

Lists of Terms

CVM–Channelized voice module on the Cisco 8400 IGX switch.

FRAD–Frame Relay Access Device.

FTC trunk–Frame trunk card (FTC) channel is the channel between the Cisco MC8310 and the IGX 8400 switch.

FTM–Frame Trunk Module on the Cisco 8400 IGX switch.

FTM protocol–The FTM protocol is the name given to the framing and information exchange protocols used between the Cisco MC3810 and the FTM card in the IGX. The frames are standards-based on the outside (Data-Link Control Identifier, CRC), but use a proprietary encapsulation inside.

UVM–Universal voice module on the Cisco 8400 IGX switch.

Restrictions

The following restrictions and limitations apply to the Cisco MC3810–IGX interworking implementation:

- This feature requires Cisco IGX 8400 switch software Version 9.1 or higher.
- One FTC trunk port to the IGX can be configured on each Cisco MC3810.
- Up to 100 connections over the FTC trunk port are supported on the Cisco MC3810.
- Data traffic, such as Frame Relay and frame forwarding, can be sent from the Cisco MC3810 to the Frame Relay module (FRM) port on the IGX.
- Voice traffic from the Cisco MC3810 to the IGX can be sent only in the following cases:
  - With Voice Activity Detection (VAD) enabled, up to 10 channels of ADPCM 32K (G.726) voice can be sent to the IGX Channelized Voice Module (CVM)/ Universal Voice Module (UVM).
  - With VAD disabled, up to 6 channels of ADPCM 32K (G.726) voice can be sent to the IGX Channelized Voice Module (CVM)/ Universal Voice Module (UVM).
  - Up to 12 channels of G.729 voice and up to 24 channels of G.729a voice can be sent to the IGX UVM.
  - Transparent signaling for analog/digital E&M immediate, analog/digital E&M wink, and analog Foreign Exchange Station (FXS) voice can be sent to the IGX CVM/UVM.
- FAX traffic up to 9.6 kbps can be sent to the IGX UVM.

Platforms

This feature is supported on the Cisco MC3810 only.

Supported MIBs and RFCs

None.

Configuration Tasks

When you configure IGX interworking on the Cisco MC3810, you must configure one interface to serve as the FTC trunk, and then you configure the specific connections over that FTC trunk.

This section is divided into the following sections:

- Configuring the Cisco MC3810 FTC Management DLCI on page 3
- Configuring the Cisco MC3810 FTC Frame Relay DLCI for Data Traffic (Optional) on page 5
- Configuring the Cisco MC3810 FTC Voice DLCI for Voice Connections (Optional) on page 8

This section assumes that you have already configured the following:

- Frame Relay interfaces
- Voice over Frame Relay dial peers
- Voice ports

Configuring the Cisco MC3810 FTC Management DLCI

The Cisco MC3810 FTC management data link connection identifier (DLCI) is required when configuring Cisco MC3810–IGX Interworking. You can only have one FTC management DLCI on each Cisco MC3810, but that management DLCI can also carry data and/or voice connections, or data and/or voice connections in conjunction with a Frame Relay trunk or a voice DLCI. You can configure the FTC management DLCI, the FTC Frame Relay DLCIs and FTC voice DLCIs in the following combinations:

- FTC management DLCI only (management traffic + data traffic and/or voice traffic)
- FTC management DLCI (management traffic + voice traffic) + FTC Frame Relay DLCI (data traffic)
- FTC management DLCI (management traffic + data traffic) + FTC voice DLCI (voice traffic)
- FTC management DLCI (management traffic) + FTC Frame Relay DLCI (data traffic) + FTC voice DLCI (voice traffic)

Regardless of the combination, you can configure up to 100 connections over the FTC trunk port.

Note Whether you configure data traffic and/or voice traffic on the FTC management DLCI depends on your configuration needs. For example, configuring data traffic and voice traffic on the FTC management DLCI allows you to use one DLCI, saving you money if you are charged for each DLCI. On the other hand, configuring data traffic over an FTC Frame Relay DLCI, or voice traffic over an FTC voice DLCI, allows you to isolate the traffic types for greater control and quality of service over the WAN.

To configure the Cisco MC3810 FTC management DLCI to the IGX 8400 FTM, perform the following tasks on the Cisco MC3810 beginning in configuration mode:

Step	Command	Purpose
1	**interface serial** {**0** | **1**}	If configuring the FTC trunk on serial interface 0 or 1, enter interface configuration mode.
	or	
	interface serial 0:*x*	If configuring the FTC trunk over the T1/E1 trunk, enter interface configuration mode, where *x* indicates the channel group number.
2	**encapsulation ftc-trunk**	Enable FTC trunk encapsulation on the interface. **Note** You can have only one interface on the Cisco MC3810 configured as the FTC trunk at one time.

Step	Command	Purpose
3	**ftc-trunk management-dlci** *dlci* [**remote-management-dlci** *dlci*]	Map the FTC trunk to an existing management data link connection identifier (DLCI). Enter the **remote-management-dlci** value if there is a public Frame Relay cloud between the Cisco MC3810 FTC port and the IGX FTM port. Enter this option only if the local DLCI and the remote DLCI are not the same. **Note** The DLCI (or the remote DLCI if configured) must match the DLCI on the IGX switch configured using the IGX **addad** command.
4	**ftc-trunk management-protocol** {**normal** | **inverted**}	Select the mode in which the management frames are sent. Use **normal** mode when the Cisco MC3810 is connected to the IGX switch. When two Cisco MC3810 concentrators are connected back-to-back, use **inverted** mode on one concentrator; the other concentrator should be set to **normal** mode.

You have a choice of how to proceed from here. Choose one of the following options:

- To configure data connections over a separate FTC Frame Relay DLCI, proceed to the "Configuring the Cisco MC3810 FTC Frame Relay DLCI for Data Traffic (Optional)" section on page 5.
- To configure voice connections over a separate FTC voice DLCI, proceed to the "Configuring the Cisco MC3810 FTC Voice DLCI for Voice Connections (Optional)" section on page 8.
- To configure all your data and voice connections on the FTC management DLCI, perform the following tasks:

Step	Command	Purpose
5	**connect** *interface* **dlci** *dlci ftc-trunk* **connection-id** *cid*	(Optional) Configure a data connection between the Cisco MC3810 and the IGX switch that will travel over the FTC management DLCI. For the *ftc-trunk* value, enter the interface on which the FTC trunk was configured on. For example, if you configured serial 0 as the FTC trunk, enter **serial 0** for the *ftc-trunk* value. **Note** Do not enter the same DLCI that was assigned to the FTC management DLCI using the **ftc-trunk management-dlci** command.
6	**connect voice** *dial-peer-tag ftc-trunk* **connection-id** *cid*	(Optional) Configure a voice connection between a voice dial-peer and the IGX switch that will travel over the FTC management DLCI. The dial peer can be either a POTS dial peer or a Voice over Frame Relay dial peer.
7	Repeat step 5 or step 6 for each data or voice connection over the FTC management DLCI.	

Configuring the FTC Management DLCI on the Cisco IGX 8400 Switch

For Frame Relay management DLCI connections on the IGX FTM card, use the following command syntax to add the Frame Relay management trunk connection(s) to the Cisco MC3810:

```
addad <slot.port> <access_device_ID> <management DLCI>
```

The management DLCI must match the DLCI or remote-management DLCI configured using the Cisco MC3810 **ftc-trunk management-dlci** command.

Note The Cisco IGX switch command syntax differs from Cisco IOS command syntax. Items in brackets (< >) are required command arguments. Items in square brackets ([ ]) are optional command arguments. These commands are based on Cisco IGX System Software Release 9.1. For more information about IGX switch configuration and commands, see the *Cisco WAN Switching Command Reference*.

Configuring the Cisco MC3810 FTC Frame Relay DLCI for Data Traffic (Optional)

In addition to the FTC management DLCI, you can optionally configure an FTC Frame Relay DLCI for data traffic. The FTC Frame Relay data travels over the FTC management DLCI configured in the previous section.

To configure the Cisco MC3810 FTC Frame Relay DLCI to support data connections to the IGX 8400 switch, perform the following tasks on the Cisco MC3810 beginning in configuration mode:

Step	Command	Purpose
1	**interface serial** {**0** | **1**}	If configuring the FTC trunk on serial interface 0 or 1, enter interface configuration mode.
	interface serial 0:*x*	If configuring the FTC trunk over the T1/E1 trunk, enter interface configuration mode, where *x* indicates the channel group number. **Note** Enter the same interface that you created the FTC Trunk on. Make sure the interface is set to **encapsulation ftc-trunk**.
2	**ftc-trunk frame-relay-dlci** *dlci* [**remote-frame-relay-dlci** *dlci*]	Map the FTC Frame Relay DLCI to an existing Frame Relay data-link connection identifier (DLCI). Enter the **remote-management-dlci** value if there is a public Frame Relay cloud between the Cisco MC3810 FTC port and the IGX FTM port. Enter this option only if the local DLCI and the remote DLCI are not the same. **Note** Do not enter the same DLCI that was assigned to the FTC management DLCI.
3	Repeat this procedure on each Cisco MC3810 that will send data traffic to an IGX 8400 switch via an FTC Frame Relay DLCI.	

After the Frame Relay FTC DLCI is configured, you can now establish connections over the FTC trunk. For more information about the connection procedures, see one of the following sections:

- Configuring the Cisco MC3810 Frame Relay Data Connection over the FTC Trunk on page 6
- Configuring the Cisco MC3810 Frame Forward Connection over the FTC Trunk on page 6
- Configuring the Cisco MC3810 IP Routing Connection over the FTC Trunk on page 7

Configuring the Cisco MC3810 Frame Relay Data Connection over the FTC Trunk

To configure the connection between the Cisco MC3810 Frame Relay DLCI and the FTC trunk, perform the following tasks on the Cisco MC3810 beginning in configuration mode:

Step	Command	Purpose
1	**connect** *interface* **dlci** *dlci ftc-trunk* **connection-id** *cid*	Configure a connection between the DLCI and the FTC trunk. For the *ftc-trunk* value, enter the interface on which the FTC trunk was configured. For example, if you configured serial 0 as the FTC trunk, enter **serial 0** for the *ftc-trunk* value. For this command, do not use either of the following DLCIs: • The DLCI that was assigned to the FTC management DLCI using the **ftc-trunk management-dlci** command • The DLCI that was assigned to the Frame Relay FTC DLCI using the **ftc-trunk frame-relay-dlci** command.
2	Repeat step 1 for each data connection over the FTC Frame Relay trunk.	

For information on configuring the data channels on the IGX switch, see the "Configuring the Data Channels on the IGX Switch" section on page 8.

Configuring the Cisco MC3810 Frame Forward Connection over the FTC Trunk

To configure a Frame Forward connection over the FTC trunk, ensure the encapsulation for the source port is High-Level Data Link Control (HDLC) and perform the following tasks on the Cisco MC3810 beginning in configuration mode:

Step	Command	Purpose
1	**interface serial** {**0** | **1**}	Enter serial interface configuration mode. **Note** This interface is not the FTC trunk interface.
2	**encapsulation hdlc**	Enable HDLC encapsulation on the interface.

Step	Command	Purpose
3	**connect** *interface* **dlci** *dlci ftc-trunk* **connection-id** *cid*	Configure a connection between the DLCI and the FTC trunk. For the *ftc-trunk* value, enter the interface on which the FTC trunk was configured. For example, if you configured serial 0 as the FTC trunk, enter **serial 0** for the *ftc-trunk* value. For this command, do not use either of the following DLCIs: • The DLCI that was assigned to the FTC management DLCI using the **ftc-trunk management-dlci** command • The DLCI that was assigned to the Frame Relay FTC DLCI using the **ftc-trunk frame-relay-dlci** command.
4	Repeat step 3 for each data connection over the FTC Frame Relay trunk.	

For information on configuring the data channels on the IGX switch, see the “Configuring the Data Channels on the IGX Switch” section on page 8.

Configuring the Cisco MC3810 IP Routing Connection over the FTC Trunk

When you configure an IP routing connection over the FTC trunk, you must use the special **switch0** designation on the interface:

Step	Command	Purpose
1	**interface switch0**	Enter interface configuration mode for Switch0. **Note** On the Cisco MC3810, you must configure IP routing on the **switch0** logical interface.
2	**frame-relay map ip** *ip-address dlci*	Map the Frame Relay DLCI to the IP address. **Note** The same DLCI should be used for end-to-end IP routing data connections on both sides of the IP network.
3	**connect switch0 dlci** *dlci ftc-trunk* **connection-id** *cid*	Configure an IP routing connection between the DLCI and the FTC trunk. Make sure to specify **switch0** as the local IP interface. For the *ftc-trunk* value, enter the interface on which the FTC trunk was configured. For example, if you configured serial 0 as the FTC trunk, enter serial 0 for the *ftc-trunk* value. For this command, do not use either of the following DLCIs: • The DLCI that was assigned to the FTC management DLCI using the **ftc-trunk management-dlci** command • The DLCI that was assigned to the Frame Relay FTC DLCI using the **ftc-trunk frame-relay-dlci** command.
4	Repeat step 3 for each IP routing data connection over the FTC Frame Relay trunk.	

For information on configuring the data channels on the IGX switch, see the next section “Configuring the Data Channels on the IGX Switch” on page 8.

Configuring the Data Channels on the IGX Switch

For Frame Relay connections on the IGX switch, use the following command syntax to add the Frame Relay connection(s) to the Cisco MC3810:

```
addcon <local_channel> <remote_node> <remote_channel> [con_type] <frame_relay_class |
[individual parameters]> [route_avoid]
```

Note The Cisco IGX switch command syntax differs from Cisco IOS command syntax. Items in brackets (< >) are required command arguments. Items in square brackets ([ ]) are optional command arguments. These commands are based on Cisco IGX System Software Release 9.1. For more information about IGX switch configuration and commands, see the *Cisco WAN Switching Command Reference*.

Configuring the Cisco MC3810 FTC Voice DLCI for Voice Connections (Optional)

In addition to the FTC management DLCI, you can optionally configure an FTC voice DLCI for voice traffic. The FTC voice traffic travels over the FTC management DLCI configured in the previous section.

To configure the FTC voice DLCI to support voice connections to the IGX 8400 switch, perform the following tasks on the Cisco MC3810 beginning in configuration mode:

Step	Command	Purpose
1	**interface serial** {**0** | **1**}	If configuring the FTC trunk on serial interface 0 or 1, enter interface configuration mode.
	or	
	interface serial 0:*x*	If configuring the FTC trunk over the T1/E1 trunk, enter interface configuration mode, where *x* indicates the channel group number. **Note** Enter the same interface on which you created the FTC management trunk. Make sure the interface is set to **encapsulation ftc-trunk**.
2	**ftc-trunk voice-dlci** *dlci* [**remote-voice-dlci** *dlci*]	Map the FTC trunk to an existing Frame Relay DLCI. Enter the **remote-management-dlci** value if there is a public Frame Relay cloud between the Cisco MC3810 FTC port and the IGX FTM port. Enter this option only if the local DLCI and the remote DLCI are not the same. **Note** Do not enter the same DLCI that was assigned to the FTC management DLCI.

Step	Command	Purpose
3	**connect voice** *dial-peer-tag ftc-trunk* **connection-id** *cid*	Configure a connection between a voice dial peer and the FTC trunk. The dial peer can be either a POTS dial peer or a Voice over Frame Relay dial peer. When making a connection from a Cisco MC3810 to an IGX UVM or CVM, use a POTS dial peer (the connection ID must be an even number). When making a connection from a Cisco MC3810 to a second Cisco MC3810, use a VoFR dial peer. For the *ftc-trunk* value, enter the interface on which the FTC trunk was configured. For example, if you configured serial 0 as the FTC trunk, enter **serial 0** for the *ftc-trunk* value.
4	Repeat step 3 for each dial peer that will be connected over the FTC voice trunk.	

Repeat this procedure on each Cisco MC3810 that will send voice traffic to an IGX 8400 switch via an FTC voice DLCI.

For information on configuring the voice channels on the IGX switch, see the next section "Configuring the Voice Channels on the IGX Switch."

Configuring the Voice Channels on the IGX Switch

For voice connections on the IGX switch, use the following command syntax to add connections to the Cisco MC3810:

```
addcon <local_channel> <remote node> <remote channel> <type> [avoid]
```

When configuring the voice channels, make sure the same voice compression mode that was configured on the Cisco MC3810 using the **codec** command is configured on the IGX voice channels. For example, if the **codec** command was set to g729ar8 on the Cisco MC3810 voice port, make sure that the UVM connection is also configured to support g729ar8 compression.

Note The Cisco IGX switch command syntax differs from Cisco IOS command syntax. Items in brackets (< >) are required command arguments. Items in square brackets ([ ]) are optional command arguments. These commands are based on Cisco IGX System Software Release 9.1. For more information about IGX switch configuration and commands, see the *Cisco WAN Switching Command Reference*.

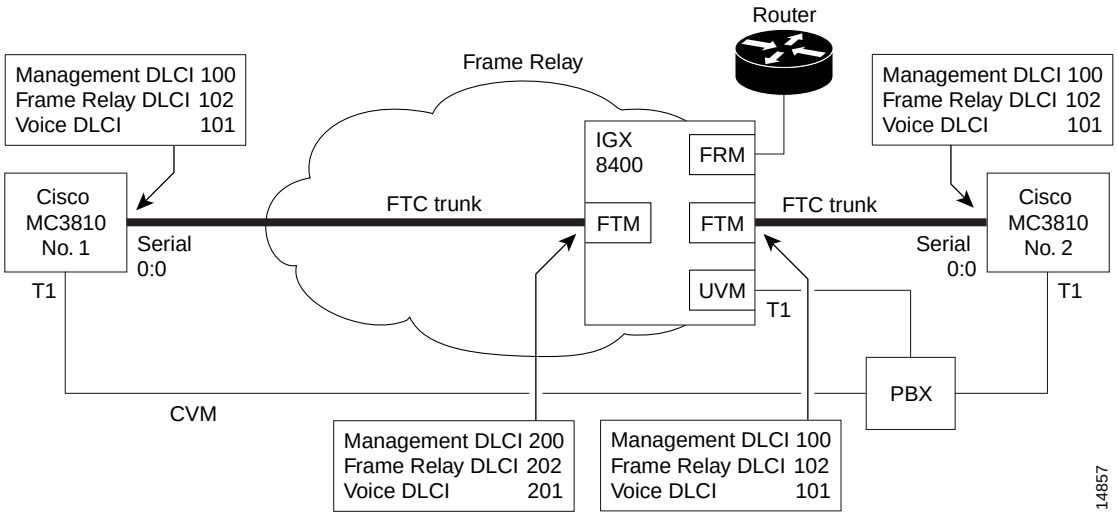
Configuration Example

This section provides an example of how to configure the Cisco MC3810 to act as an access device to an IGX 8400 switch.

Figure 1 shows an example of two Cisco MC3810 concentrators connected to an IGX 8400 FTM, with other connections to the UVM through a PBX. The configuration examples following the figure include commands to set up the session connections, the voice PVC connections, routing through switch 0, Common Channel Signaling (CCS) frame forwarding support, the Cisco MC3810–UVM connections, and the Cisco MC3810–CVM connections.

Because the voice connections between the two Cisco MC3810 concentrators are over a Frame Relay network, VoFR dial peers must be configured on both concentrators. The session target configured on both concentrators should be the same.

Figure 1 Cisco MC3810–IGX Interworking Configuration Example



Configuration on Cisco MC3810 No. 1

```
hostname router19

network-clock base-rate 56k
ip subnet-zero



controller T1 0
 framing esf
 linecode b8zs
 channel-group 0 timeslots 1-24 speed 64

controller T1 1
 mode cas
 voice-group 0 timeslots 1-2 type e&m-immediate-start
 voice-group 1 timeslots 3-4 type e&m-delay-dial
 voice-group 2 timeslots 5-6 type e&m-wink-start

connect Switch0 dlci 103 Serial0:0 connection-id 103
connect Voice4000 Serial0:0 connection-id 40
connect Voice2 Serial0:0 connection-id 50
connect Voice4 Serial0:0 connection-id 52
connect Voice6 Serial0:0 connection-id 54
connect Serial1 dlci 250 Serial0:0 connection-id 250

interface Ethernet0
 mac-address 0001.0101.0101
 ip address 10.10.10.51 255.255.255.0
 no ip directed-broadcast

interface Serial0
 no ip address
 no ip directed-broadcast
 no ip mroute-cache
 bandwidth 1536
 no keepalive
 shutdown
 hold-queue 1024 out

interface Serial1
 no ip address
 no ip directed-broadcast
 no keepalive
 clockrate 64000

interface Serial0:0
 no ip address
 no ip directed-broadcast
 encapsulation ftc-trunk
 no ip mroute-cache
 no keepalive
 ftc-trunk voice-dlci 101 remote-voice-dlci 201
 ftc-trunk frame-relay-dlci 102 remote-frame-relay-dlci 202
 ftc-trunk management-dlci 100 remote-management-dlci 200
 ftc-trunk management-protocol normal
 hold-queue 150 in
 hold-queue 1024 out

interface Switch0
 ip address 10.10.12.1 255.255.255.0
 no ip directed-broadcast
 encapsulation frame-relay
 no fair-queue
```

```
 frame-relay map ip 10.10.11.51 103
 frame-relay map ip 10.10.12.2 103
 frame-relay map ip 10.10.11.197 103

interface FR-ATM20
 no ip address
 no ip directed-broadcast
 shutdown

ip default-gateway 1.7.0.1
ip classless
ip route 0.0.0.0 0.0.0.0 1.7.0.1
ip route 10.10.11.51 255.255.255.255 Switch0
ip route 10.10.11.197 255.255.255.255 Switch0



line con 0
 exec-timeout 0 0
 transport input none
line aux 0
line 2 3
line vty 0 4
 login


voice-port 1/1
 codec g726r32

voice-port 1/2
 codec g726r32

voice-port 1/3
 codec g729r8

voice-port 1/4
 codec g729r8

voice-port 1/5

voice-port 1/6

dial-peer voice 1 pots
 destination-pattern 2001
 port 1/1

dial-peer voice 2 pots
 destination-pattern 2002
 port 1/2

dial-peer voice 3 pots
 destination-pattern 2003
 port 1/3

dial-peer voice 4 pots
 destination-pattern 2004
 port 1/4


dial-peer voice 5 pots
 destination-pattern 2005
 port 1/5

dial-peer voice 6 pots
 destination-pattern 2006
```

```
 port 1/6

dial-peer voice 4000 vofr
 destination-pattern 4...
 session target Serial0:0 40
```

Configuration on Cisco MC3810 No. 2

```
hostname router21

network-clock base-rate 56k
ip subnet-zero

controller T1 0
 framing esf
 linecode b8zs
 channel-group 0 timeslots 1-24 speed 64

controller T1 1
 mode cas
 voice-group 0 timeslots 1-2 type e&m-immediate-start
 voice-group 1 timeslots 3-4 type e&m-delay-dial
 voice-group 2 timeslots 5-6 type e&m-wink-start


connect Switch0 dlci 103 Serial0:0 connection-id 103
connect Voice2000 Serial0:0 connection-id 40
connect Voice2 Serial0:0 connection-id 50
connect Voice4 Serial0:0 connection-id 52
connect Voice6 Serial0:0 connection-id 54
connect Serial1 dlci 250 Serial0:0 connection-id 250

interface Ethernet0
 ip address 10.10.11.51 255.255.255.0
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache

interface Serial0
 no ip address
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 no keepalive
 shutdown
 hold-queue 1024 out

interface Serial1
 no ip address
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 no keepalive
 no fair-queue
 clockrate 64000
 hold-queue 1024 out
```

```
interface Serial0:0
 no ip address
 no ip directed-broadcast
 encapsulation ftc-trunk
 no ip mroute-cache
 no keepalive
 ftc-trunk voice-dlci 101
 ftc-trunk frame-relay-dlci 102
 ftc-trunk management-dlci 100
 ftc-trunk management-protocol normal
 hold-queue 150 in
 hold-queue 1024 out

interface Switch0
 ip address 10.10.12.2 255.255.255.0
 no ip directed-broadcast
 encapsulation frame-relay
 no fair-queue
 frame-relay map ip 10.10.10.51 103
 frame-relay map ip 10.10.12.1 103
 frame-relay map ip 10.10.10.196 103

interface FR-ATM20
 no ip address
 no ip directed-broadcast
 shutdown

ip default-gateway 1.7.0.1
ip classless
ip route 0.0.0.0 0.0.0.0 1.7.0.1
ip route 10.10.10.51 255.255.255.255 Switch0
ip route 10.10.10.196 255.255.255.255 Switch0

logging trap debugging

line con 0
 exec-timeout 0 0
 transport input none
line aux 0
line 2 3
line vty 0 4
 password lab
 login

voice-port 1/1
 codec g726r32

voice-port 1/2
 codec g726r32

voice-port 1/3
 codec g729r8

voice-port 1/4
 codec g729r8

voice-port 1/5

voice-port 1/6

dial-peer voice 1 pots
 destination-pattern 4001
 port 1/1
```

```
dial-peer voice 2 pots
 destination-pattern 4002
 port 1/2
dial-peer voice 3 pots
 destination-pattern 4003
 port 1/3

dial-peer voice 4 pots
 destination-pattern 4004
 port 1/4

dial-peer voice 5 pots
 destination-pattern 4005
 port 1/5

dial-peer voice 6 pots
 destination-pattern 4006
 port 1/6

dial-peer voice 2000 vofr
 destination-pattern 2...
 session target Serial0:0 40

end
```

Command Reference

The following new or modified commands are used to configure the Cisco MC3810–IGX interworking feature:

- **connect**
- **connect voice**
- **encapsulation ftc-trunk**
- **ftc-trunk frame-relay-dlci**
- **ftc-trunk management-dlci**
- **ftc-trunk management-protocol**
- **ftc-trunk voice-dlci**

connect

To configure a data connection on the Cisco MC3810 to an IGX switch that will travel over the FTC trunk, use the **connect** global configuration command. To cancel the connection, use the **no** form of this command.

connect *interface* **dlci** *dlci ftc-trunk* **connection-id** *cid*
no connect *interface* **dlci** *dlci ftc-trunk* **connection-id** *cid*

Syntax Description

interface	Specifies the interface on the Cisco MC3810 on which the connection is configured.
dlci	Specifies the DLCI for the connection.
ftc-trunk	Specifies the Cisco MC3810 interface on which the FTC trunk was configured.
cid	Specifies the connection ID.

Default

No data connection over the FTC trunk is configured.

Command Mode

Global configuration mode

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(2)T.

When configuring a connection for an IP routing data connection over an FTC trunk, specify **Switch0** for the local *interface* value.

For this command, when entering the DLCI value, do not use either of the following DLCIs:

- The DLCI that was assigned to the FTC management DLCI using the **ftc-trunk management-dlci** command
- The DLCI that was assigned to the FTC Frame Relay DLCI using the **ftc-trunk frame-relay-dlci** command.

Example

The following command establishes a data connection on serial port 1:

```
connect Serial1 dlci 250 Serial0:0 connection-id 250
```

Related Commands

connect voice
encapsulation ftc-trunk
ftc-trunk frame-relay-dlci

ftc-trunk management-dlci
ftc-trunk management-protocol
ftc-trunk voice-dlci

connect voice

To configure a connection on the Cisco MC3810 between a voice dial peer and the FTC trunk, use the **connect voice** global configuration command. To disable the connection, use the **no** form of this command.

connect voice *dial-peer-tag ftc-trunk* **connection-id** *cid*
no connect voice *dial-peer-tag ftc-trunk* **connection-id** *cid*

Syntax Description

dlal-peer-tag	Specifies the voice dial-peer tag for the connection. Valid entries are from 1 to 10000. The dial peer can either be a POTS dial peer or a VoFR dial peer.
ftc-trunk	Specifies the Cisco MC3810 interface on which the FTC trunk was configured.
connection-id *cid*	Specifies the connection ID.

Default

No voice connection over the FTC trunk is configured.

Command Mode

Global configuration mode

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(2)T.

Example

The following command establishes a voice connection for dial peer 2 on serial port 0:

```
connect Voice2 Serial0:0 connection-id 50
```

Related Commands

connect
encapsulation ftc-trunk
ftc-trunk frame-relay-dlci
ftc-trunk management-dlci
ftc-trunk management-protocol
ftc-trunk voice-dlci

encapsulation ftc-trunk

To enable FTC trunk encapsulation on a serial interface on the Cisco MC3810, use the **encapsulation ftc-trunk** interface configuration command. To disable FTC trunk encapsulation, use the **no** form of this command.

encapsulation ftc-trunk
no encapsulation ftc-trunk

Syntax Description

This command has no keywords or arguments.

Default

FTC trunk encapsulation is not enabled.

Command Mode

Interface configuration mode.

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(2)T.

Example

To configure FTC trunk encapsulation on serial interface 1 on the Cisco MC3810, enter the following commands:

```
interface serial 1
 encapsulation ftc-trunk
```

Related Commands

connect
connect voice
ftc-trunk frame-relay-dlci
ftc-trunk management-dlci
ftc-trunk management-protocol
ftc-trunk voice-dlci

ftc-trunk frame-relay-dlci

To map the FTC Frame Relay DLCI to an existing Frame Relay DLCI for data traffic on the Cisco MC3810, use the **ftc-trunk frame-relay-dlci** interface configuration command. To remove the FTC Frame Relay DLCI from the interface, use the **no** form of this command.

ftc-trunk frame-relay-dlci *dlci* [**remote-frame-relay-dlci** *dlci*]
no ftc-trunk frame-relay-dlci *dlci* [**remote-frame-relay-dlci** *dlci*]

Syntax Description

dlci	Specifies the Frame Relay DLCI for the IGX switch.
remote-frame-relay-dlci *dlci*	(Optional) Specifies the remote Frame Relay DLCI if there is a public Frame Relay cloud between the Cisco MC3810 FTC port and the IGX FTM port. Enter this option only if the local DLCI and the remote DLCI are not the same.

Default

No FTC trunk Frame Relay DLCI is configured.

Command Mode

Interface configuration mode

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(2)T.

Do not enter the same DLCI that was assigned to the FTC management DLCI using the **ftc-trunk management-dlci** command.

Example

The following configures DLCI 200 as the FTC trunk Frame Relay DLCI:

```
interface serial 1
 ftc-trunk frame-relay-dlci 200
```

Related Commands

connect
connect voice
encapsulation ftc-trunk
ftc-trunk management-dlci
ftc-trunk management-protocol
ftc-trunk voice-dlci

ftc-trunk management-dlci

To map the FTC management DLCI to an existing Frame Relay DLCI for management traffic on the Cisco MC3810, use the **ftc-trunk management-dlci** interface configuration command. To remove the FTC management DLCI from the interface, use the **no** form of this command.

ftc-trunk management-dlci *dlci* [**remote-management-dlci** *dlci*]
no ftc-trunk management-dlci *dlci* [**remote-management-dlci** *dlci*]

Syntax Description

dlci	Specifies the Frame Relay DLCI for the IGX switch.
remote-management-dlci *dlci*	(Optional) Specifies the remote management DLCI if there is a public Frame Relay cloud between the Cisco MC3810 FTC port and the IGX FTM port. Enter this option only if the local DLCI and the remote DLCI are not the same.

Default

No FTC trunk management DLCI is configured.

Command Mode

Interface configuration mode

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(2)T.

The DLCI (or the remote DLCI if configured) must match the DLCI on the IGX switch configured using the IGX **addad** command.

Example

The following configures DLCI 100 as the FTC trunk management DLCI:

```
interface serial 1
 encapsulation ftc-trunk
 ftc-trunk management-dlci 100
```

Related Commands

connect
connect voice
encapsulation ftc-trunk
ftc-trunk frame-relay-dlci
ftc-trunk management-protocol
ftc-trunk voice-dlci

ftc-trunk management-protocol

To select the mode on the Cisco MC3810 that management frames are sent on the FTC trunk management DLCI, use the **ftc-management-protocol** interface configuration command. To restore the default value, use the **no** form of this command.

ftc-trunk management-protocol {**normal** | **inverted**}
no ftc-trunk management-protocol {**normal** | **inverted**}

Syntax Description

normal	Specifies normal mode.
inverted	Specifies inverted mode.

Default

Normal mode.

Command Mode

Interface configuration mode

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(2)T.

Use **normal** mode when the Cisco MC3810 is connected directly to the IGX switch. When two Cisco MC3810 concentrators are connected back-to-back, use **inverted** mode on one concentrator and **normal** mode on the other concentrator.

This command is available only when the **ftc-trunk management-dlci** command is configured.

Example

The following configures the FTC trunk management protocol to normal mode:

```
interface serial 1
 encapsulation ftc-trunk
 ftc-trunk management-dlci 100
 ftc-trunk management-protocol normal
```

Related Commands

connect
connect voice
encapsulation ftc-trunk
ftc-trunk frame-relay-dlci
ftc-trunk management-dlci
ftc-trunk voice-dlci

ftc-trunk voice-dlci

To map the FTC voice DLCI to an existing Frame Relay DLCI for voice traffic on the Cisco MC3810, use the **ftc-trunk voice-dlci** interface configuration command. To remove the FTC voice DLCI from the interface, use the **no** form of this command.

ftc-trunk voice-dlci *dlci* [**remote-voice-dlci** *dlci*]
no ftc-trunk voice-dlci *dlci* [**remote-voice-dlci** *dlci*]

Syntax Description

dlci	Specifies the Frame Relay DLCI for the IGX switch.
remote-voice-dlci *dlci*	(Optional) Specifies the remote voice DLCI If there is a public Frame Relay cloud between the Cisco MC3810 FTC port and the IGX FTM port. Enter this option only if the local DLCI and the remote DLCI are not the same.

Default

No FTC trunk voice DLCI is configured.

Command Mode

Interface configuration mode

Usage Guidelines

This command first appeared in Cisco IOS Release 12.0(2)T.

Do not enter the same DLCI that was assigned to the FTC management DLCI using the **ftc-trunk management-dlci** command.

Example

The following configures the FTC trunk voice DLCI:

```
interface serial 1
 ftc-trunk voice-dlci 100
```

Related Commands

connect
connect voice
encapsulation ftc-trunk
ftc-trunk frame-relay-dlci
ftc-trunk management-dlci
ftc-trunk management-protocol